16K Dynamic Memory - MX-D-2

From:
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[illegible] ROAD
NEW [illegible], WIRRAL
MERSEYSIDE L62 5AG
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Function.

This board provides 16K bytes of dynamic memory (RAM) for use with a Z8Ø processor.

Operation.

The top two address lines are decoded using IC12 to select the location of the 16K block. The layout diagram shows a DIP switch for address selection and only one switch must be closed at any one time. A wire link may be used as an alternative to this switch. Closing the positions shown on the layout gives the following memory base addresses:-

Position	Base Addresses
1	0
2	16K
3	32K
4	48K

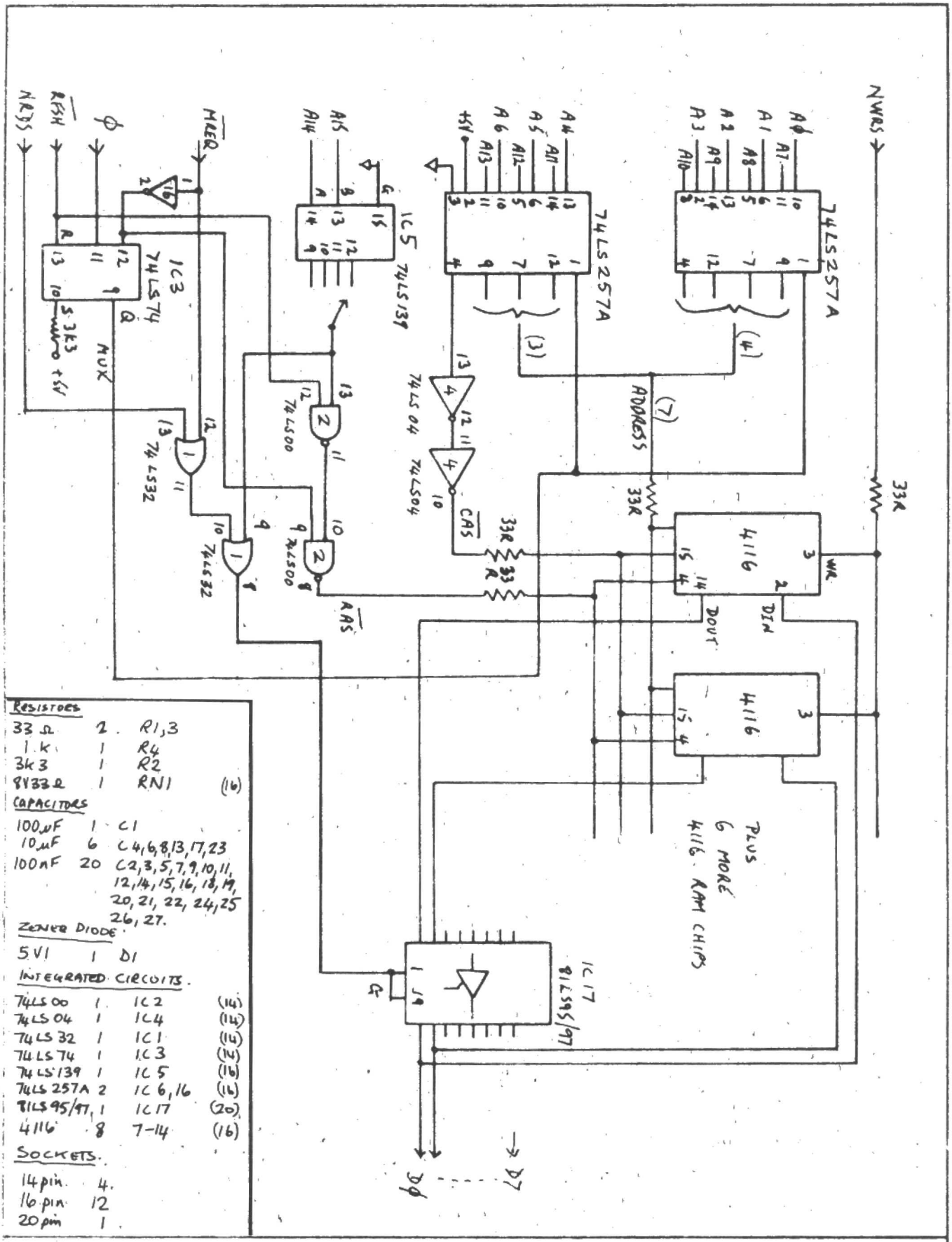
The remaining address lines are multiplexed using IC10 and 11; first the lower seven address lines (AØ - A6) and then the higher seven (A7- A13) are connected to the memory devices (IC1 - IC8). The timing requirements of the memory devices are such that the $\overline{RAS}$ signal goes low while the low addresses are connected, that the addresses change over and that $\overline{CAS}$ then goes low. This circuit achieves this sequencing by using $\overline{MREQ}$ to initiate $\overline{RAS}$ whereas the MUX signal which switches the multiplexer is controlled by the processor clock Ø. $\overline{CAS}$ is then generated via the multiplexer and delayed by two gates of IC16. Note that whereas $\overline{MREQ}$ follows the negative edge of the CPU clock, the MUX signal is clocked by the positive edge.

The block select signal from IC12 is combined with the read strobe NRDS using IC13 and used to control the output buffer IC10 to enable data from the memory onto the bus during read operations.

Dynamic membry must be refreshed periodically to retain the data stored in it. This is achieved by pulsing RAS for each of the 128 combinations of the seven address lines. The Z8Ø performs the selection of these combinations automatically and simultaneously generates a RFSH signal. This signal is used to pulse RAS via IC14. Resistors (33R) have been inserted in the address lines and all control lines to the memory block to minimise transmission line effects which can cause ringing and memory mal-functions.

A more detailed description of the operation of this board is to be found in the Mostek 'Memory data book and Designer's guide'. Although designed specifically for 4116 type memory devices, National type MM5290 generally can also be used.

JSD 2.7.80



Resistors

33 Ω	2	R1,3	
1 k	1	R4	
3k3	1	R2	
8X33Ω	1	RN1	(16)

Capacitors

100μF	1	C1
10μF	6	C4,6,8,13,17,23
100nF	20	C2,3,5,7,9,10,11, 12,14,15,16,18,19, 20,21,22,24,25 26,27.

Zener Diode

5V1	1	D1

Integrated Circuits

74LS00	1	IC2	(14)
74LS04	1	IC4	(14)
74LS32	1	IC1	(14)
74LS74	1	IC3	(14)
74LS139	1	IC5	(16)
74LS257A	2	IC6,16	(16)
81LS95/97	1	IC17	(20)
4116	8	7-14	(16)

Sockets

14 pin	4.
16 pin	12
20 pin	1

Kemitron Electronics

PARTS LIST AND LS ICs SHOWN 12-8-82

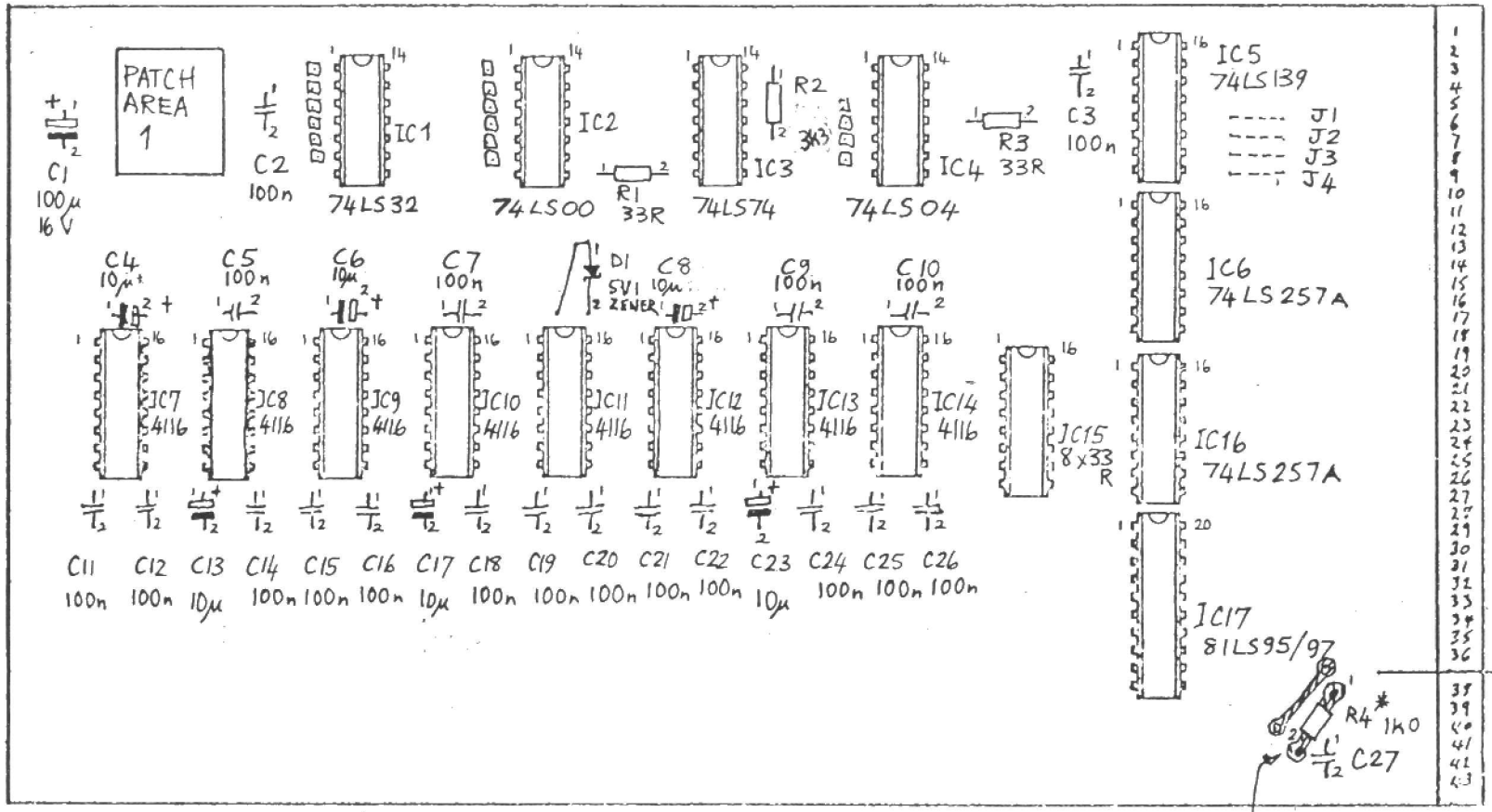
Drn. [illegible]

Date 16/6/80

MXD2

DRG. NO 102030 | 1 OF 1

D1 =



* Important!
Break track on this side of board beneath R4 before fitting this component

There are numerous holes (not illustrated) where short wire thru' links must be made to connect both sides of the board.

DRAFT ONLY

GREENBANK ELECTRONICS

MXD-2 ASSEMBLY DRAWING

DRG. NO. (102030) DRAFT | 1 OF 1

COMPONENT PRICE LIST FOR MXD-2 CARD — List Ref: MXD-2/P5
(Prices exclude VAT) — October 1980, Revised July 1985

				Prices each, ex.VAT	
Resistors 0.25W					
CR2533R	2	R1,3	0.02	0.04	
CR251K0	1	R4	0.02	0.02	
CR253K3	1	R2	0.02	0.02	
DIL Resistor	(Use 16-pin Socket)				
DIL8-33R	1	RN1	0.57	0.57	
			Resistor Pack RMXD2	0.65	0.65
Capacitors					
("MAL" = Low Leakage Miniature Aluminium Electrolytic; "DEC" = 47n-100n* Decoupling grade polyester, or Ceramic; "ELECR" = Radial Electrolytic)					
DEC	20	C2,3,5,7,9-12,14-16, 18-22,24-27	0.09	1.80	
MAL10U	6	C4,6,8,13,17,23	0.07	0.42	
ELECR100U	1	C1	0.10	0.10	
*Manual shows 100nF			Capacitor Pack CMXD2	2.32	2.32
Diode					
BZY88 C5V1	1	CR1	0.10	0.10	
			Diode DMXD2	0.10	0.10
Integrated Circuits	(Use Sockets)				
4116	8	U1-8 (16 pin)	1.75	14.00	
74LS00	1	U14 (14 pin)	0.36	0.36	
74LS04	1	U16 (14 pin)	0.36	0.36	
74LS32	1	U13 (14 pin)	0.36	0.36	
74LS74	1	U15 (14 pin)	0.41	0.41	
74LS139	1	U12 (16 pin)	0.54	0.54	
74LS257A	2	U10,11 (16 pin)	0.56	1.12	
81LS95	1	U9 (20 pin)	1.88	1.88	
			Integrated Circuit Pack ICMXD2	19.03	19.03
DIL Switch					
DILSW4	1	S1 (8 pin)	1.00	1.00	1.00
DIL Sockets					
DIL8	1	S1	0.08	0.08	
DIL14	4	U13,14,15,16	0.10	0.40	
DIL16	12	U1-8,10-12,RN	0.10	1.20	
DIL20	1	U9	0.22	0.22	
			DIL Socket Pack SKMXD2	1.90	1.90

Total cost of kit of all parts listed so far PMXD2: 25.00

OPTIONS (i.e. Items not included in standard kit of parts)

MXD-2 p.c.b, sold separately as "BMXD2"	13.50	
Manual, sold separately as "MMXD2" (Zero Rated for VAT)	0.75	0%
Plastic Card Handle (Bolt on type)	0.20	
1" Card Front Kit, inc fixings and mtg. brackets, new type CF1	2.99	
ditto, old (RS) type OCF1	3.99	

(Note: A card front is not easy to fit to this card without some modifications; the card is however very useful if no card front is fitted, for taking up "spare" space behind any cards with 2" front panels.)

Add 50p handling charge to each transaction, and 15% VAT.

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Access/Visa Welcome (no surcharges).